

REMARKS

I. Status of the Claims

Claims 1-12 are pending. Claims 1-12 stand rejected. By this Amendment, Applicants amended claims 1, 4, 9, and 10 to more particularly point out and distinctly claim what Applicants regard as the invention. Support for the amendment can be found throughout the specification, for instance, at page 8, lines 14-17. No new matter has been introduced. Applicants request reconsideration of the application in view of the amendments and remarks.

II. Claim Rejections under 35 USC § 102

A. Rejections over Madgavkar

Claims 1, 4, 5, and 9 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,378,048 to Madgavkar et al. ("Madgavkar") for the reasons of record. See Office Action at 2-3. Applicants submit that the amendments to claims 1 further distinguish the claimed invention from Madgavkar and render this rejection moot.

Madgavkar discloses substoichiometric combustion of low heating value gases using two different supported platinum catalysts. See Madgavkar, Abstract. Madgavkar explains what the "low heating value gases" include as follows:

There are many types and sources of low heating value gases which can advantageously be combusted by our process, including those low heating value gases which are waste gases as well as those low heating value gases which are intentionally produced. Thus, low heating value gas streams predominating in hydrocarbon combustibles are produced as the liquids-free by-product flue gas obtained from the subterranean in situ combustion processes for the

recovery of hydrocarbons from carbonaceous deposits such as petroleum reservoirs, tar sands, oil shale formations, and the like. Or a low heating value gas stream can itself be produced as the primary product such as the low heating value gas stream resulting from the underground combustion of difficult-to-mine coal deposits. The low heating value gas stream can also be either intentionally produced in a factory operation or it can be a factory waste gas stream including synthesis and producer gas; blast furnace gas; waste gases resulting from phosphorus furnaces; from various metallurgical and chemical manufacturing; and the like.

Madgavkar at column 4, lines 24-44. Notably, none of the listed "low heat value gases" is a reactant mixture comprising fuel, steam, and air, as set forth in claim 1, as amended. Applicants also note that none of the embodiments set forth in Examples 1-9 has steam in the reactant mixture. *Id.* at columns 7-10. Therefore, Madgavkar does not disclose a first and second autothermal reforming catalysts or a reactant mixture comprising fuel, steam, and air, as recited in claim 1, as amended. In addition, Madgavkar does not disclose an autothermal reforming reaction as recited in claim 9, as amended.

For at least this reason, claims 1 and 9, as amended, as well as claims 4-5, which are dependent from claim 1, are not anticipated by Madgavkar. Applicants respectfully request the withdrawal of the rejections.

B. Rejections over Le Gal

Claims 1, 3, and 5-9 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,797,737 to Le Gal et al. ("Le Gal") for the reasons of record. See Office Action at 3-4. Applicants respectfully disagree.

Le Gal discloses a catalyst combustion system that is designed to completely combust fuel with a minimum amount of carbon monoxide or nitrogen oxides. See Le Gal, column 1, lines 10-16. The reactants mixture in Le Gal contains fuel and air, but not steam. *Id.*, Example 3 at columns 7-8. In contrast, independent claim 1 recites a reactant mixture comprising fuel, steam, and air.

In addition, the catalysts in Le Gal are combustion catalyst that promotes the combustion of fuel. In contrast, independent claims 1 and 9 recite an autothermal reaction using a first and a second autothermal reforming catalyst.

Therefore, Le Gal does not disclose a first and second autothermal reforming catalysts or a reactant mixture comprising fuel, steam, and air, as recited in claim 1, as amended. Nor does Le Gal disclose an autothermal reforming reaction as recited in claim 9, as amended. For at least these reasons, claims 1 and 9, as amended, as well as claims 3 and 5-8, which depends from claim 1, are not anticipated by Le Gal. Applicants respectfully request the withdrawal of the rejections.

C. Rejections over Borup

Claims 1, 3, 5-10, and 12 have been rejected under 35 U.S.C. § 102(a) or § 102(e) as being anticipated by U.S. Patent No. 6,521,204 to Borup et al. ("Borup") for the reasons of record. See Office Action at 4-5. In particular, the Examiner indicates

that Borup “teaches a catalyst system for an autothermal reformer comprising a first, upstream portion containing a first catalyst (a partial oxidation or POX catalyst) and a second, downstream portion having a second catalyst (a steam reforming or SR catalyst).” *Id.* at 4. The Examiner further acknowledges that “[t]he lightoff temperature of both catalysts are not indicated.” *Id.* at 5. Therefore, Borup discloses neither 1) the first and the second autothermal catalysts as set forth in claim 1, as amended, nor 2) the difference between the lightoff temperature of the first and the second autothermal catalysts, as set forth in claims 1 and 9, as amended. Applicants submit that, for at least these reasons, Borup does not anticipate claims 1 and 9, as amended, or any claims dependent thereon.

III. Claim Rejections under 35 U.S.C § 103

A. Rejections over Borup

Claims 1-12 have been rejected under 35 U.S.C. § 103(a) over Borup for reasons of record. See Office Action at 4-5 and 7. Applicants respectfully disagree.

Borup “teaches a catalyst system for an autothermal reformer comprising a first, upstream portion containing a first catalyst (a partial oxidation or POX catalyst) and a second, downstream portion having a second catalyst (a steam reforming or SR catalyst).” *Id.* at 4. Notably, Borup provides no suggestion or rationale for using two portions of autothermal catalysts in a catalyst system.

Further, no where in Borup does it disclose or suggest the lightoff temperatures of the catalysts. The Examiner asserts that “the lightoff temperatures necessarily fall into the broad ranges required by the claim(s) as the first (POX) catalyst comprises a

significantly greater portion of platinum than the second reforming catalyst (as increased platinum is known to lower the lightoff temperature; see for instance evidentiary document US4378048, Example 4.)” Applicants disagree.

At the outset, Borup does not indicate or suggest that POX catalyst contains “a significantly greater portion of platinum” than a steam reforming catalyst does. Furthermore, the lightoff temperature is not determined only by the content of the platinum in a catalyst. Other conditions not being the same, more platinum does not necessarily correspond to a lower lightoff temperature.

For at least the reasons set forth above, Applicants submit that the Examiner has not shown that one skilled in the art would have arrived at the claimed invention in claims 1 and 9, as amended, as well as claims dependent therefrom by reading Borup. Applicants respectfully request the withdrawal of this rejection.

B. Rejections over Madgavkar

Claims 2-3 and 6-8 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Madgavkar. See Office Action at 6-7. Madgavkar discloses substoichiometric combustion of low heating value gases using two different supported platinum catalysts. As set forth in section II.A, none of the low heating value gases disclosed in Madgavkar is a reactant mixture comprising fuel, steam, and air. Claim 1, as amended, recites elements including autothermal reforming of a reactant mixture comprising fuel, air, and steam, and two autothermal reforming catalysts. Since Madgavkar is silent with respect to such a reaction reactant mixture comprising fuel, steam, and air, nothing in the document would have suggested the invention recited in

independent claim 1, let alone dependent claims 2-3 and 6-8. For at least this reason, Applicants submit that claims 2-3 and 6-8 are patentable over Madgavkar.

C. Rejections over Le Gal

Claim 2 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Le Gal. See Office Action at 8. However, Le Gal discloses a catalyst combustion system that is designed to combust fuel. The reactants mixture in Le Gal contains fuel and air, but not steam. In contrast, claim 1 recites a reactant mixture comprising fuel, air, and steam. Since Le Gal is silent with respect to such a reaction reactant mixture comprising fuel, steam, and air, nothing in the document would have suggested the invention recited in independent claim 1, let alone dependent claim 2. For at least this reason, Applicants submit that claim 2 is patentable over Le Gal.

IV. Conclusion

In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration of this application and the timely allowance of the pending claims.

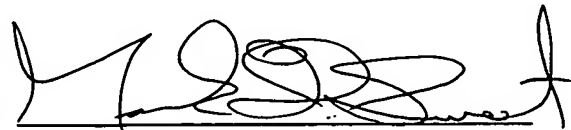
Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

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